REMARKS

The Office Action has rejected Claims 89-101 under 35 U.S.C. § 102(b) or in the alternative under 35 U.S.C. § 103(a) as defining subject matter which is allegedly anticipated, or in the alternative, rendered obvious by the teachings in U.S. Patent No. 5,466,294 to Kearney et al. ("Kearney et al."), WO 96/10650 of which Hyoky et al. are inventors ("Hyoky et al.") or U.S. Patent No. 6,379,735 to Yukio et al. ("Yukio et al."). In addition, Claims 88-101 are rejected under 35 U.S.C. § 102(b) as defining subject matter which is allegedly anticipated by, or in the alternative, rendered obvious by, the teachings in U.S. Patent No. 4,101,338 to Rapaport et al. ("Rapaport et al."). Further Claims 88-101 are rejected under 35 U.S.C. § 102(e) or in the alternative under 35 U.S.C. § 103(a) as defining subject matter which is allegedly anticipated by or as defining subject matter which is allegedly rendered obvious by the teachings in U.S. Patent No. 6,896,811 to Heikkila et al. ("Heikkila et al."). Finally, Claims 88 and 90-101 are rejected under 35 U.S.C. § 103(a) as defining subject matter which is allegedly rendered obvious by the teachings in U.S. Patent No. 4,432,806 to Madse et al. ("Madse et al.").

Applicants are submitting the following Remarks which are deemed to place the present application for condition for allowance. Favorable action is respectfully requested.

At the outset, applicants wish to thank Examiner Wong for the courtesy extended to applicants' attorney during the telephone interview on Oct. 26, and for her helpful suggestions. During the interview, applicants discussed the rejections of the Office Action providing arguments for patentability relative to the cited references. Although Examiner Wong and applicants' attorney did not reach an agreement, Examiner Wing encouraged applicants to present the arguments given at the interview in the Response.

Applicants have made a minor amendment to Claim 89 so that all terms therein have proper antecedent basis. This amendment does not change the scope thereof. No new matter has been added to the application.

The present invention is directed to, *inter alia*, a foodstuff to which is added a product in an amount effective to improve the flavor of the foodstuff, said product being prepared by the process comprising:

(a) subjecting sugar beet extract to membrane filtration to obtain a retentate and permeate;

(b) recovering said permeate and subjecting said permeate to chromatography;

(c) collecting a front end fraction and at least one other fraction; and

(d) recovering and concentrating the fraction or fractions which are debetainized and comprised of a mixture of nonvolatile components substantially comprising salts and organic acids present in said sugar beet extract. In another embodiment, it is directed to, *inter alia*, a foodstuff to which is added a product, said product being added to the foodstuff in amount effective to improve the flavor thereof, said product being prepared by the process comprising:

(e) subjecting sugar beet extract to chromatography to obtain a front end fraction and at least one other fraction,

(f) recovering one or more fractions from said chromatography which are debetainized and comprised of a mixture of non-volatile components substantially comprising salts and organic acid presenting said sugar beet extract,

(g) subjecting the one or more debetainized fractions comprised of a mixture of non-volatile components to membrane filtration to obtain a permeate and retentate,

(h) recovering and concentrating said permeate.

It is to be noted that as described in the application, the product formed from membrane filtration and chromatographic separation is to be added to food for human consumption. For example, the specification refers to foods that the product is to be added, such as soft drink, sports drink, tea, coffee, beer, alcoholic beverages, soup, juice, jams, chocolate products, ice cream. See page 27, lines 14-22 and page 28, lines 10-17 of the instant specification. These are examples of foods that are consumed by humans. Thus, it is clear to the person of ordinary skill in the art, that the food to which the product is added is food for human consumption, and is not animal feed.

In fact, the product, which is claimed herein, is a non-volatile residue of sugar beet extract after being subjected to membrane filtration and chromatography. The residue after the removal of the volatile in the present invention is typically mostly dark fluid that has a very foul smelling odor. Most people say that they would not want to taste it. In fact, because of its foul smelling properties and its dark color, one of ordinary skill in the art would probably think of adding it to animal feed, but definitely not to a food for human consumption. One of ordinary skill in the art would not contemplate utilizing such a product for improving the flavor of food for human consumption. However, it is highly surprising to one or ordinary skill in the art at the time of filing of the underlying application that the product produced in accordance with the present invention when added to food enhances flavor. It is also novel and surprising that a flavor improver can be based on the non-volatile components of sugar beet extract. It is well known that taste, aroma and flavor are intermingled and that most of what we call taste is in actual fact not discerned with the tongue but rather with the nose. It is therefore the volatile components, which typically provide good taste and flavor. This well-known of volatile components fact is utilized in Yukio et al., discussed *infra* which collects the volatile

components of molasses (food grade) by distilling the same with added water and ethanol in a distilling apparatus called a Spinning Cone Column.

According to the definitions in the specification of the present application (see p. 10, lines 28 to 31), the *essentially non-volatile* character means that the components in question are not easily evaporated and that they remain in solution even after evaporative operations at temperatures below 100 °C and especially at about 60 to 70 °C. The temperature in the mouth is about 37 °C and would not be expected to volatilize such components. The tongue is said to feel only four types of taste: sour, bitter, sweet and salty. It is not obvious that with this limitation of the tongue, a mixture based on components, which are not volatile, and which cannot be expected to reach the nose regions sensitive to aroma and flavor can provide a flavor improver.

It is to be noted that betaine is a non-volatile component of sugar extract and that betaine is known to have a bitter taste. Betaine thus obviously has a taste (bitter taste) that can be felt with the tongue. However, the product of the invention has been debetainized.

Pursuant to the rejection of Claims 89-101 35 U.S.C. § 103 the Office Action cites Kearney et al.

According to the Office Action, Kearney et al. disclose a process for separating sugar beet juice into different components using chromatographic techniques, producing a product. which is not used as a food for human consumption claimed. The product of Kearney et al., i.e., the raw syrup raffinate, is taught to be useful for animal feed.

Kearney et al. do not teach, disclose or suggest that the product therefrom could be used in food for human consumption, nor does it teach that the product therefrom would be used to improve the flavor of foodstuff. Nor does Kearney et al. add a flavor enhancer to food for human consumption, as claimed. Further, the by-product of Kearney et al. (the raw syrup

raffinate) obtained in Example 1 of Kearney et al. contains 2.8 % betaine (see Table at the end of Example 1).

Moreover, it is quite apparent that one of ordinary skill in the art would not add a product that is fit for animal feed to food for human consumption or for improving the flavor of the food for human consumption. Further, there is no teaching or suggestion in Kearney et al. that such a product would be added to any food for human consumption or enhance flavor. On the other hand, the product of the present invention is for human consumption; when added to food, it enhances the flavor thereof. Further, as described above, the product of the present invention to be added to food has been debetainized. Accordingly, the foodstuff which has been modified by the addition of the flavor enhancer of the present invention is not taught, described or suggested by the teachings of Kearney et al.

Thus, for the reasons provided Kearney et al. do not teach, disclose or suggest the present invention.

Hyoky et al. disclose the chromatography of beet molasses. It, however, does not teach any use of the residue collected therefrom. Thus, Hyoky et al. do not teach, disclose or suggest that the product thereof would be used to improve the flavor of food, as claimed or any food containing the product thereof. Moreover, the Hyoky et al. do not teach, disclose or suggest any foodstuff to which has been added a product obtained from sugar beet extract or the flavor enhancer of the present invention, as claimed. Therefore, Hyoky et al. do not teach, disclose or suggest the present invention.

Yukio et al. relate to a method for preparing a sugar-like flavorous component based on the components of molasses, which are used as the usual foods (see column 3, line 3).

This indicates that the molasses of Yukio et al. are of cane origin and not of beet origin, as in the present invention, since only cane molasses are used as foods.

As shown in the chart that was submitted with the Response dated July 22, 2008, the composition of cane molasses is different from that of beet molasses. One of the differences is that cane molasses does not have betaine, while the beet molasses contains betaine. In addition, beet molasses contains pyrazine and DMSD, while cane molasses does not.

In the method described in Yukio et al., the components of molasses are recovered using a specific distillation equipment called a Spinning Cone Column (SCC). Thus Yukio et al. do not separate the components using column chromatography; instead they use distillation. In the distillation, according to Yukio et al., ion exchange water, ethanol and molasses are added into a feed tank. These components are mixed and dissolved thoroughly with stirring and the resulting solution is introduced into the SCC. The temperature in the column during the distillation is kept between 40 to 60 °C. Thus, the flavorous product recovered in Yukio et al. consists of the volatile components of cane molasses. Yukio et al. do not use a chromatographic method.

Therefore, the product of Yukio et al. contains volatile components, while the products of the present invention contain the non-volatile components of sugar beet.

The product of the present invention specifically comprises essentially non-volatile components, by which is meant components, which remain in solution even though they are subjected to evaporative (distilling) operations at a temperature as high as 60 to 70 °C (see the specification, page 10, lines 28 to 31).

Although the distillation of Yukio et al. is also a fractionation process, it is not one, which provides a product of essentially non-volatile character. In fact, the evaporation of

the volatile components of the present invention is the counterpart of distillation. In an evaporation, as in the present invention, the volatile components are removed. In a distillation, as in Yukio et al., the volatile components are recovered. As evidence of the difference, attention is directed to the attached table and gas chromatographs of the volatile components of cane molasses and beet molasses.

From the table, it is evident that the distillate of the cane molasses (Yukio et al.) contains no pyrazines or DMSD, while the non-volatile component of beet molasses contains DMDS as well as pyrazines. On the other hand, the distillate of cane molasses as well as cane molasses contain Beta-damascenone, while the non-distillate portions of beet molasses do not contain the component. Thus, the volatiles product of Yukio et al. is not the same as the non-volatile product of the present invention.

It is thus clear that the components recovered by spinning cone distillation at 40 to 60 °C in Yukio et al. are volatile chemical compounds totally different from the non-volatile chemical compounds, which remain in solution despite evaporation at 60 to 70 °C and which make up the mixture of the present invention.

While it comes as no surprise to a person skilled in the art that the volatile components of molasses can provide a sugar-like flavor as in Yukio et al., it is by no means obvious that the non-volatile components can improve a flavor when added to food. The residue after the removal of the volatiles is typically a musty dark fluid that most people would not even like to taste.

Thus, it must be understood that the distillation occurring in Yukio et al. by the very nature of the fractionation recovers ONLY volatile components of the molasses. Thus, the process of Yukio et al cannot obtain the essentially non-volatile components of the present

invention. The fractionation process of the present invention includes evaporation, the opposite to distillation, i.e. involves the removal of volatile components from the product.

To reiterate the above, the flavorous product recovered in Yukio et al. consists of the volatile components of molasses while the product of the present invention specifically comprises essentially non-volatile components, by which is meant components, which remain in solution even though they are subjected to evaporative (distilling) operations (see the specification, page 10, lines 28 to 31). In a distillation, as in Yukio et al., the volatile components are recovered. Consequently, it should be quite clear to the skilled artisan that the components recovered by the spinning cone distillation at 40 to 60 °C in Yukio et al. are volatile chemical compounds totally different from the non-volatile chemical compounds, which remain in solution despite evaporation at 60 to 70 °C and which make up the mixture of the present invention. Simply stated, as the SCC process used by Yukio et al. is a distillation process, it cannot possibly yield the non-volatile components obtained by the present invention.

To more clearly differentiate the claimed invention from Yukio et al., as well as the other prior art, the independent claims recite to "a combination of chromatographic separation and membrane filtration". These two fractionation steps, i.e., chromatographic separation and membrane filtration, influence the end product in different ways and provide a product having a totally different composition and totally different properties from any of those obtained by the fractionations used in the cited references. This undoubtedly distinguishes the present invention from that of Yukio et al. coupled with the understanding that the stripping in the SCC distillation apparatus of Yukio et al. recovers only volatiles.

Although Yukio et al. teaches a volatile flavor improver, it is clearly distinguished from the present invention and precludes it from being used as prior art against the present

invention. Thus, Yukio et al. do not teach, disclose or suggest a foodstuff to which has been added the flavor enhancer of the present invention, as claimed.

Thus, the claimed invention is patentable over Kearney et al., Hyoky et al. and Yukio et al. Therefore, for the reasons provided this rejection is obviated; withdrawal thereof is respectfully requested.

Pursuant to the second rejection of Claims 88-101 under 35 U.S.C. § 102(b) or in the alternative under 35 U.S.C. § 103(a), the Office Action cites Rapaport et al.

Rapaport et al. are directed to a process for fractionating carbohydrate containing materials such as molasses, by utilizing an ion exclusion resin whereby a first portion of the material and a second less dense portion are sequentially fed to the resin. In another embodiment, the molasses is first treated to remove organic non-sugar materials in the form of a precipitate by adding ferric ion to the molasses for form a precipitate and passing the so treated molasses through an ion exclusion resin. It is noted that the specification refers to the use of sugar cane molasses as the material subjected to the process described therein.

But, Rapaport et al. do not teach or disclose the addition of the product of the present invention to food, as claimed. A review of Rapaport et al. clearly shows that there is no mention therein of the product thereof being added to food, as in the present case. Thus, there is no teaching or suggestion in Rapaport et al. that the product therein can be used as a flavor enhancer, or to enhance flavor of the foodstuff to which the product is added. Thus, Rappaport et al. do not teach, disclose or suggest foodstuff that is enhanced by a flavor enhancer - - let alone a flavor enhancer of the present invention. Thus, the present invention is patentable over Rapaport, that is, Rapaport et al. do not teach, disclose or suggest the present invention. Withdrawal of the rejection is respectfully requested.

Pursuant to the rejection of Claims 88-101 under 35 U.S.C. § 102(e) or in the alternative 35 U.S.C. § 103, the Office Action cites Heikkila et al.

Heikkila et al. disclose a method for, *inter alia*, fractioning a solution of molasses into two or more fractions by a chromatographic simulated moving bed process in which the dissolved substances present in the feedstock are separated in the partial packed beds and the formed separation profile is circulated more than once or less than once through the chromatographic separation loop during one cycle. Again, as with Rapaport, Heikkila et al. do not disclose a process for producing a flavor enhancer. A review of Heikkila et al. clearly establishes that there is no teaching therein of the product being added to foodstuff, as claimed. Thus, Heikkla et al. do not teach, disclose or suggest a foodstuff to which is added a flavor enhancer—let alone the flavor enhancer of the present invention-- or the foodstuff so modified, as claimed. Therefore, this rejection is obviated; withdrawal thereof is respectfully requested.

Pursuant to the rejection of Claims 88 and 90-101 under 35 U.S.C. § 103(a), the Office Action cites Madsen et al.

Madsen et al. disclose the ultrafiltration of beet sugar juice, with the permeate being used for sugar production. There is no teaching therein to add the product to food for human consumption. There is no teaching of foodstuff containing the product thereof. Madsen et al. do not teach, disclose or suggest that the product improves flavor of the food.

Thus, Madsen does not teach, disclose or suggest addition of the flavor enhancer of the present invention to foodstuff or the foodstuff so modified by the addition of the flavor enhancer of the present invention, as claimed. Therefore, this rejection is obviated; withdrawal thereof is respectfully requested.

The Office Action has withdrawn Claims 66-87 alleging that the subject matter is being drawn to a non-elected invention. Applicants request reconsideration thereof in view of the Remarks dated April 23, 2007, the contents of which are incorporated by reference. The subject matter in Claims 66-87 is not independent of the product of Claims 88 and 89 *et seq* as the products of Claims 88 and 89 *et seq.* are prepared by the process described in Claims 66-87. Moreover, the patent classification of the product and the process are the same, Class 426, Subclass 150, so there is no additional burden on the USPTO to examine the subject matter in Claims 66-87 as well. Applicants thereby respectfully request rejoinder thereof.

In view of the Remarks hereinabove, it is respectfully submitted that the present case is in condition for allowance, which action is earnestly solicited.

Respectfully submitted,

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